

Name: \_\_\_\_\_

### at1124exam: Radicals and Squares (v820)

#### Question 1

Simplify the radical expressions.

$$\sqrt{44}$$

$$\sqrt{18}$$

$$\sqrt{63}$$

$$\sqrt{2 \cdot 2 \cdot 11}$$

$$2\sqrt{11}$$

$$\sqrt{3 \cdot 3 \cdot 2}$$

$$3\sqrt{2}$$

$$\sqrt{3 \cdot 3 \cdot 7}$$

$$3\sqrt{7}$$

#### Question 2

Find all solutions to the equation below:

$$10((x - 10)^2 - 8) = 80$$

First, divide both sides by 10.

$$(x - 10)^2 - 8 = 8$$

Then, add 8 to both sides.

$$(x - 10)^2 = 16$$

Undo the squaring. Remember the plus-minus symbol.

$$x - 10 = \pm 4$$

Add 10 to both sides.

$$x = 10 \pm 4$$

So the two solutions are  $x = 14$  and  $x = 6$ .

**Question 3**

By completing the square, find both solutions to the given equation. *You must show work for full credit!*

$$x^2 + 10x = 56$$

$$x^2 + 10x + 25 = 56 + 25$$

$$x^2 + 10x + 25 = 81$$

$$(x + 5)^2 = 81$$

$$x + 5 = \pm 9$$

$$x = -5 \pm 9$$

$$x = 4 \quad \text{or} \quad x = -14$$

**Question 4**

A quadratic polynomial function is shown below in standard form.

$$y = 3x^2 + 24x + 39$$

Express the function in **vertex form** and identify the **location** of the vertex.

From the first two terms, factor out 3 .

$$y = 3(x^2 + 8x) + 39$$

We want a perfect square. Halve 8 and square the result to get 16 . Add and subtract that value inside the parentheses.

$$y = 3(x^2 + 8x + 16 - 16) + 39$$

Factor the perfect-square trinomial.

$$y = 3((x + 4)^2 - 16) + 39$$

Distribute the 3.

$$y = 3(x + 4)^2 - 48 + 39$$

Combine the constants to get **vertex form**:

$$y = 3(x + 4)^2 - 9$$

The vertex is at point  $(-4, -9)$ .